REMARKS

The Applicants thank SPE Chan and Examiner Bello for their generous time and consideration given during the personal interview that was conducted on April 13, 2004. The Applicants also thank Examiner Bello for his time and consideration given during several phone conferences that occurred prior to the personal interview of April 13, 2004.

Consideration of the present application is respectfully requested in light of the above amendments to the application that are commensurate with the personal interview of April 13, 2004 and in view of the following remarks.

Claims 1-52 have been rejected. Upon entry of this amendment, Claims 1-52 have been canceled while Claims 53-67 have been added and remain pending in this application. The independent claims for this application are Claims 53 and 67.

Rejections under 35 U.S.C. § 112, second paragraph

The Examiner rejected Claims 24-52 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicants regard as the invention. The Applicants have cancelled Claims 1-52 and therefore, this rejection has been rendered moot. Accordingly, reconsideration and withdrawal of this rejection are respectfully requested.

Rejections under 35 U.S.C. § 103

The Examiner has rejected Claims 1, 21, 24, and 41 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Pat. No. 5,541,917 issued in the name of Farris on July 30, 1996 (hereinafter, the "Farris" reference) in view of a printed publication, entitled, "Heathrow - Experience," authored by John Bourne that was printed as an IEEE publication in 1990 (hereinafter, the "Bourne" reference), and further in view of a printed publication, entitled, "A Broadband Access Network Based on Optical Signal Processing: The Photonic Highway," authored by K. Yamaguchi of Japan that was printed as an IEEE publication in 1990 (hereinafter, the "Yamaguichi" reference).

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The Examiner rejected Claims 2, 5, 7-12, 14-20, 22, 23, 25, 27, 29-37, 39, 40, and 43-52 under 35 U.S.C. § 103(a) as being unpatentable over the Farris reference, the Bourne reference, the Yamaguichi reference, and U.S. Pat. No. 4,763,317 issued in the name of Lehman et al. on August 9, 1988 (hereinafter, the "Lehman" reference).

Claims 13 and 38 were rejected under 35 U.S.C. § 103(a) as being unpatentable the Farris reference, the Bourne reference, the Yamaguichi reference, the Lehman reference, and U.S. Pat. No. 5,880,864 issued in the name of Williams et al. on March 9, 1999 (hereinafter, the "Williams" reference). The Examiner has also rejected Claim 24 as being obvious over U.S. Pat. No. 5,572,347 issued in the name of Burton et al on November 5, 1996 (hereinafter, the "Burton" reference).

These rejections are respectfully traversed.

The Applicants have cancelled Claims 1-52, and therefore, the rejections of these claims under 35 U.S.C. § 103(a) have been rendered moot. However, in order to expedite examination of the newly added claims, the Applicants offer a discussion of these references below with respect to the newly added claims.

<u>Independent Claim 53</u>

It is respectfully submitted that the Farris, Bourne, Yamaguchi, Lehman, Williams, and Burton references considered alone or in combination fail to describe, teach, or suggest the recitations enumerated in Claim 53. These references fail to describe, teach, or suggest an optical network system comprising the combination of (1) a data service hub for sending downstream optical data signals on a first optical waveguide, and for sending downstream optical RF modulated television broadcast signals on a second optical waveguide; (2) a plurality of optical taps, each optical tap dividing downstream optical signals comprising a combination of the downstream optical data signals and the optical RF modulated television broadcast signals between a plurality of optical waveguides coupled to a plurality of subscriber optical interfaces; (3) each subscriber optical interface providing electrical communications to a subscriber, each subscriber optical interface coupled to a respective optical tap by an optical waveguide, for receiving the downstream optical signals from a respective optical tap and converting the downstream optical signals into downstream electrical signals; (4) a laser transceiver node disposed between the data service hub and the optical tap, for communicating optical signals to

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and from the data service hub and to and from a respective optical tap, for apportioning bandwidth that is shared between groups of subscriber optical interfaces connected to a respective optical tap, the laser transceiver node further comprising: (5) a plurality of multiplexers for providing downstream modulation signals to (6) respective optical transmitters and for receiving upstream electrical signals from (7) respective optical receivers, each multiplexer corresponding to a respective optical tap; (8) a plurality of bi-directional splitters for receiving downstream and upstream optical signals, each bi-directional splitter coupled to a respective optical transmitter and a respective optical receiver, (9) an optical transceiver coupled to the first optical waveguide for converting downstream optical data signals from the first optical waveguide into downstream electrical data signals, for converting upstream electrical data signals into optical data signals; (10) a routing device coupled to each multiplexer and the optical transceiver, for assigning downstream electrical data signals received from the optical transceiver to predetermined multiplexers, for combining upstream electrical data signals from respective multiplexers into one electrical signal that modulates the optical transceiver; and (11) an optical splitter coupled to the second optical waveguide and (12) respective optical diplexers, the diplexers for combining the downstream optical RF modulated television broadcast signals from the second optical waveguide with downstream optical data signals, as recited in independent Claim 53.

The Farris reference illustrates in Figure 1B (reproduced below) a video and telephone network system that includes a broadcast server 101 that digitizes broadcast video that is sent over an optical waveguide 170 to a host digital terminal (HDT) 180. The HDT 180 also receives broadband services from an integrated service control point 40 via an optical fiber 415.

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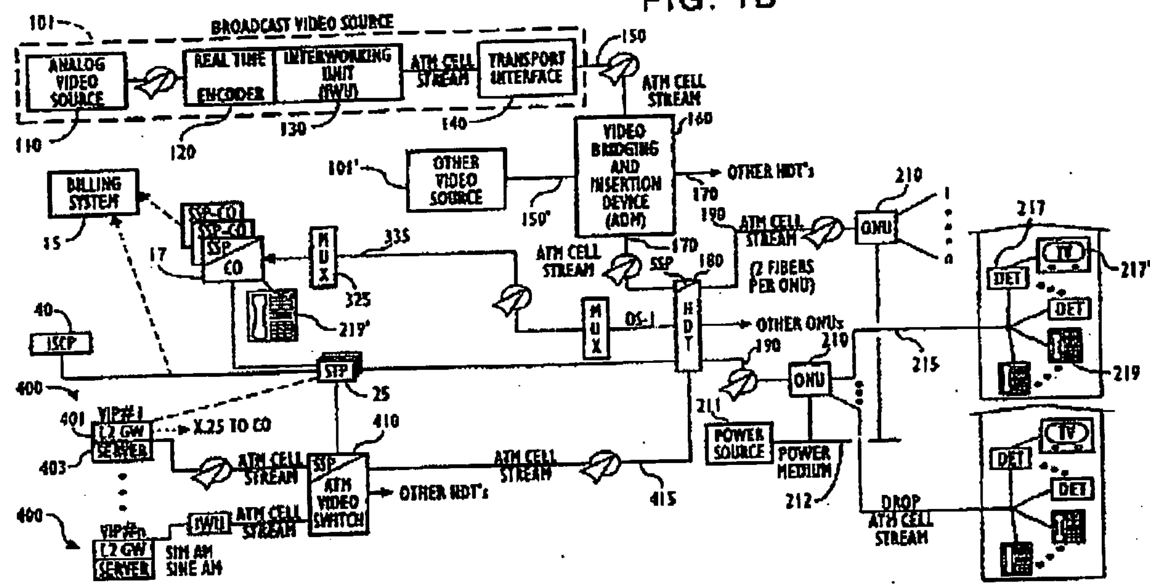
FIG. 1B



The HDT 180 communicates with optical network units (ONUs) 210 via an optical fiber pair 190. The ONUs 210 convert the optical signals received from the HDT 180 into the electrical domain. The ONUs 210 then send electrical signals over coaxial cable and twisted wire pairs 215 to subscribers who use digital entertainment terminals (DETs) coupled to television sets 217. See the Farris reference, column 13, lines 50-61.

Figure 4 of the Farris reference reproduced below illustrates more details of the HDTs 180. Each HDT 180 (also referred by the Farris reference as an electronic program switch) includes a line interface module 1851 and a trunk interface module 1853.

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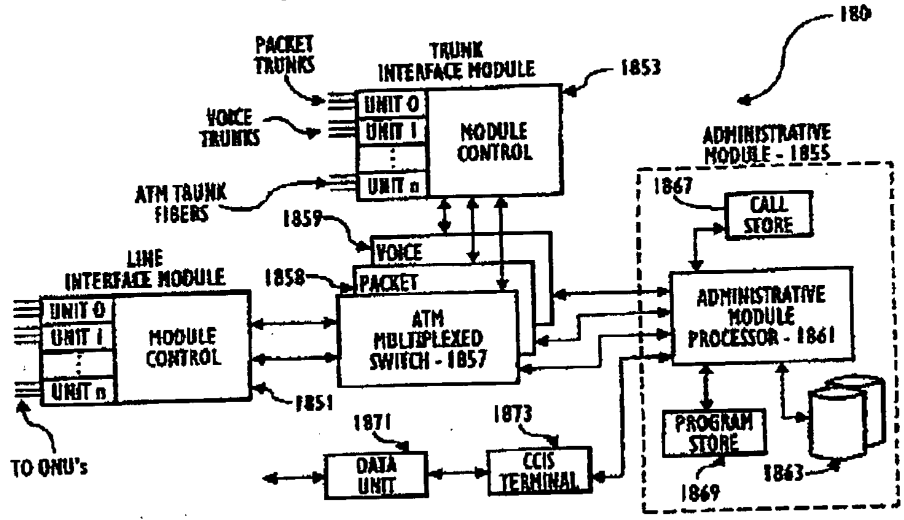
FIG. 4



The line interface module 1851 converts optical signals to electrical signals and vice and versa for communication with the optical network units (ONUs) 210 that are coupled to the subscribers. The line interface module 1851 handles upstream voice telephone information and packet data information originating from the subscribers. See Farris reference, column 22, lines 51-65.

The trunk interface module 1853 handles downstream broadcast video information in ATM cell stream form. The trunk interface module 1853 also manages broadband information that includes data communication. See Farris reference, column 23, lines 1-10.

There are at least seven deficiencies of the Farris reference compared to Claim 53. The Farris reference does not describe, teach, or suggest (a) a data service hub for sending downstream optical RF modulated television broadcast signals on a second optical waveguide; (b) a plurality of optical taps; (c) a plurality of subscriber optical interfaces, where each subscriber optical interface provides electrical communications to a subscriber, each subscriber optical interface coupled to a respective optical tap by an optical waveguide, for receiving the downstream optical signals from a respective optical tap and converting the downstream optical signals into downstream electrical signals; (d) a plurality of multiplexers, where each multiplexer corresponds to a respective optical tap; (e) a plurality of bi-directional splitters for receiving downstream and upstream optical signals, each bi-directional splitter coupled to a respective optical transmitter and a respective optical receiver; (f) a routing device for combining upstream

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electrical data signals from respective multiplexers into one electrical signal that modulates the optical transceiver; and (g) an optical splitter coupled to the second optical waveguide and respective optical diplexers, the diplexers for combining the downstream optical RF modulated television broadcast signals from the second optical waveguide with downstream optical data signals.

Regarding the first deficiency (a), the Farris reference, as noted above, teaches digitizing broadcast video downstream optical signals which is opposite to downstream optical RF modulated television broadcast signals as recited in Claim 53. The Farris reference explains that the video signals comprise asynchronous transfer mode (ATM) broadband signals that are different than RF modulated television broadcast signals. See the Farris reference, column 14, lines 7-11. Because the Farris reference does not teach downstream optical RF modulated television broadcast signals, it logically follows that the Farris reference does not teach sending downstream optical RF modulated television broadcast signals on a second optical waveguide and an optical splitter coupled to the second optical waveguide and respective optical diplexers, the diplexers for combining the downstream optical RF modulated television broadcast signals from the second optical waveguide with downstream optical data signals. This is the seventh deficiency (g) of the Farris compared to Claim 53.

Regarding the second and third deficiencies (b) and (c), the Farris reference is not an entirely optical network system that connects directly with a subscriber's premises, such as a home. Instead of providing any teaching of optical taps and subscriber optical interfaces, the Farris reference teaches optical network units (ONUs) 210 coupled to coaxial cables and twisted wire pairs 215. The ONUs 210 convert the optical signals received from the HDT 180 into the electrical domain. The ONUs 210 then send electrical signals over coaxial cable and twisted wire pairs 215 to subscribers who use digital entertainment terminals (DETs) coupled to television sets 217. See the Farris reference, column 13, lines 50-61.

Regarding the fourth through the six deficiencies (d)-(f) of the Farris reference, this reference simply does not teach (d) a plurality of multiplexers, where each multiplexer corresponds to a respective optical tap; (e) a plurality of bi-directional splitters for receiving downstream and upstream optical signals, each bi-directional splitter coupled to a respective optical transmitter and a respective optical receiver; and (f) a routing device for combining upstream electrical data signals from respective multiplexers into one electrical signal that modulates the optical transceiver.

Opposite to Claim 53, the Farris reference teaches three multiplexers 1857, 1858, and 1859 in Figure 4 that do not correspond to any optical taps (because the Farris reference does not use optical taps since it is not an entirely optical network) and these three multiplexers do not have their upstream outputs combined by a routing device. The multiplexers 1857, 1858, and 1859 are designed to process specific and separate types of signals. The first multiplexer 1857 processes video signals, while the third multiplexer 1859 processes voice signals and the second multiplexer 1858 processes data signals. The first multiplexer 1857 sends its upstream video signals over a first optical waveguide (ATM Fiber trunk) while the second multiplexer 1858 sends its upstream data signals over a second optical waveguide (Packet Fiber trunk) and the third multiplexer 1859 sends its upstream voice signals over a third optical waveguide (Voice Fiber trunk).

The Examiner admits that the Farris reference does not teach downstream optical RF modulated television broadcast signals and combining the downstream optical RF modulated television broadcast signals from a second optical waveguide with downstream optical data signals. To make up for this deficiency, the Examiner relies on the Yamaguichi reference.

<u>The Yamaguichi Reference</u>

Figure 11 (reproduced below) of the Yamaguichi reference illustrates a photonic highway architecture applied to a ring metro area network (MAN). This architecture uses slave photonic access nodes (PANs) that include an optical amplifier, a wave division de-multiplexer (WDM), and an optical to electrical converter.

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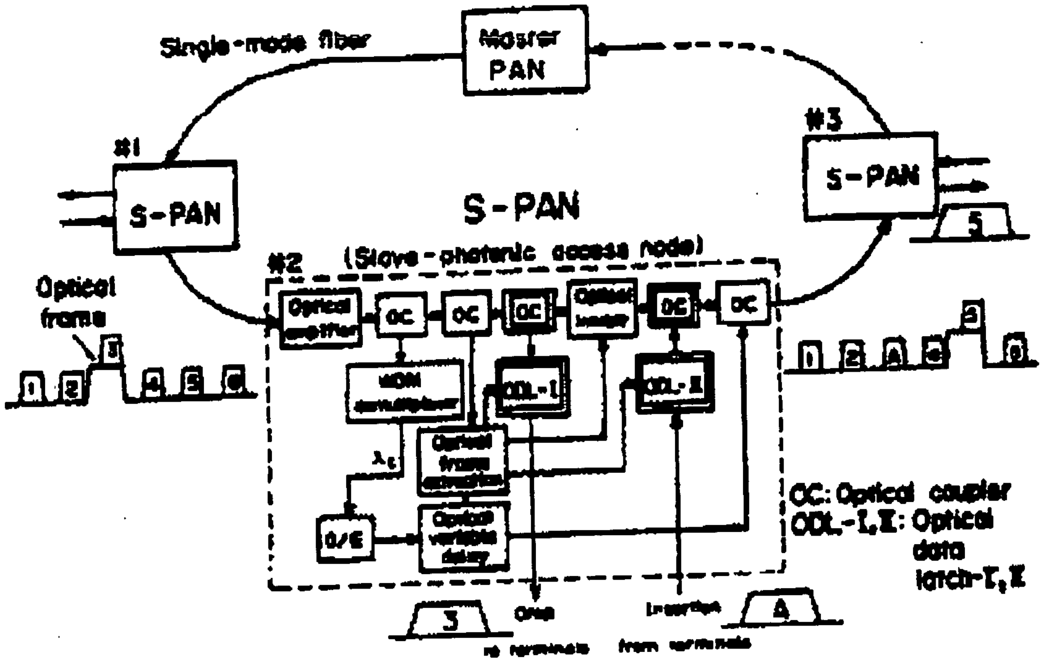

Each photonic access node (PAN) further includes an optical frame extraction circuit, an optical variable delay circuit, an optical inhibit circuit, optical delay latches (ODLs), and optical couplers. The optical variable delay circuit provides delay time for extracted frame pulses. The control signal used by the delay circuit is sent from the master photonic access network by a common wavelength. See the Yamaguichi reference, page 1033, first and second columns.

One of ordinary skill in the art recognizes that the Yamaguichi reference teaches wavelength division multiplexing (WDM) of optical signals. Meanwhile, the architecture of the Farris reference does not employ wavelength division multiplexing. The Farris reference provides optical signals operating at single wavelengths or a finite number of wavelengths compared to wavelength division multiplexing which requires multiple or a plurality of optical wavelengths to operate effectively. The proposed modification made by the Examiner goes against conventional electrical engineering principles.

Even if the proposed modification made by the Examiner was remotely feasible, the Yamaguichi reference does not provide for any teaching of a data service hub for sending downstream optical RF modulated television broadcast signals on a second optical waveguide; a plurality of optical taps; a plurality of subscriber optical interfaces; a plurality of multiplexers, where each multiplexer corresponds to a respective optical tap; a plurality of bi-directional splitters for receiving downstream and upstream optical signals, each bi-directional splitter coupled to a respective optical transmitter and a respective optical receiver; a routing device for combining upstream electrical data signals from respective multiplexers into one electrical signal that modulates the optical transceiver; and an optical splitter coupled to the second optical waveguide and respective optical diplexers, the diplexers for combining the downstream optical RF modulated television broadcast signals from the second optical waveguide with downstream optical data signals.

The Examiner admits that both the Farris reference and the Yamaguichi reference fail to provide any teaching of the elements in the claims which provide extending the fiber all the way to a subscriber's home. To make up for this deficiency, the Examiner relies upon the Bourne reference. The Applicants note that the Examiner's Office Action of October 24, 2003 does not address each of the optical elements missing from the Farris reference and the Yamaguichi reference that are allegedly taught in the Bourne reference. If the Examiner maintains this position, then the Applicants request that the Examiner specifically identify the optical elements of the Claim 53 that are explicitly taught by the Bourne reference and that are not found in the Farris and Yamaguichi references.

The Bourne Reference

Figure 1 of the Bourne reference illustrates a central office that includes a video selector switch and a wave division multiplexer (WDM) bay. The fibers coupled to the WDM bay carry ISDN data and video information. The fibers coupled to the DMS 100 switch and DMS-1 switch carry telephone signals.

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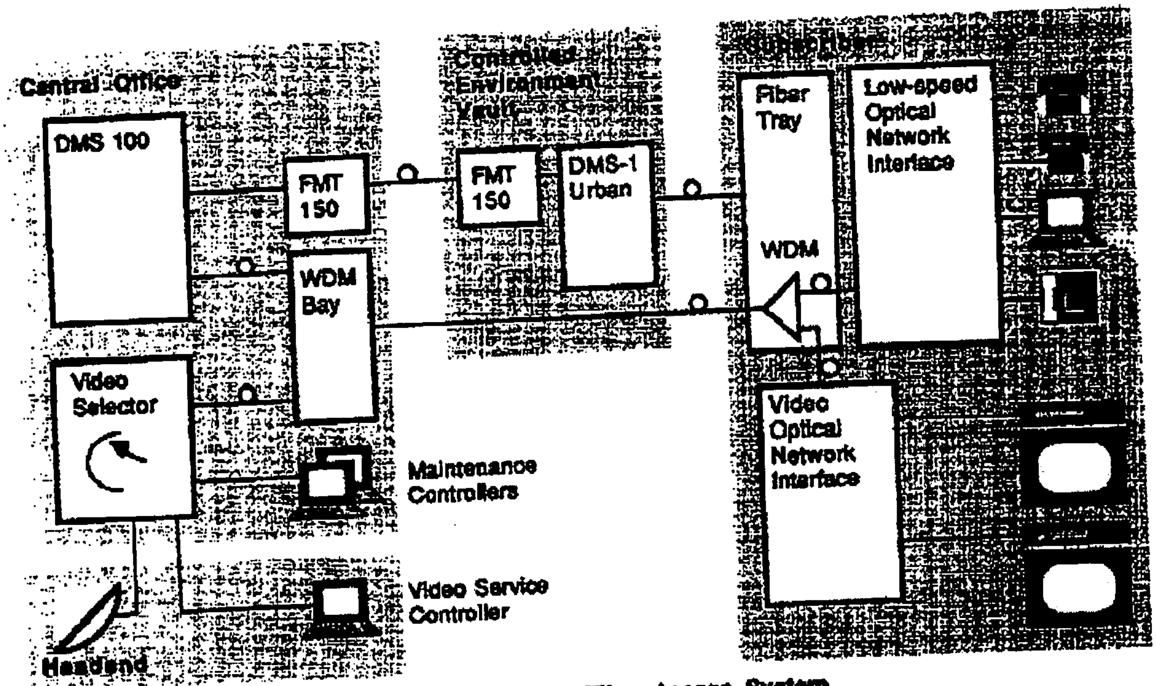


Figure 1. Heathrow Fiber Access System

This means that each subscriber is coupled to the optical network via two optical fibers. The two fibers from each subscriber are connected to a controlled environment vault (CEV). See Bourne reference, page 327.1, second column, last two paragraphs.

Similar to the Yamaguichi and Farris references, the Bourne reference does not provide for any teaching of a data service hub for sending downstream optical RF modulated television broadcast signals on a second optical waveguide; a plurality of optical taps; a plurality of subscriber optical interfaces; a plurality of multiplexers, where each multiplexer corresponds to a respective optical tap; a plurality of bi-directional splitters for receiving downstream and upstream optical signals, each bi-directional splitter coupled to a respective optical transmitter and a respective optical receiver; a routing device for combining upstream electrical data signals from respective multiplexers into one electrical signal that modulates the optical transceiver; and an optical splitter coupled to the second optical waveguide and respective optical diplexers, the diplexers for combining the downstream optical RF modulated television broadcast signals from the second optical waveguide with downstream optical data signals.

The Examiner admits that the Farris, Yamaguichi, and Bourne references fail to provide any teaching of a routing device that apportions bandwidth between subscribers of an optical network system. To make up for this deficiency, the Examiner relies upon the Lehman reference.

The Lehman Reference

Figure 1 of the Lehman reference (illustrated below) illustrates a remote node 103 that is part of a switched integrated services multiband digital network that includes a distribution pedestal 109 and a local central node 110. Each distribution pedestal is connected to a subscriber 102 and a remote node with optical fibers 105.

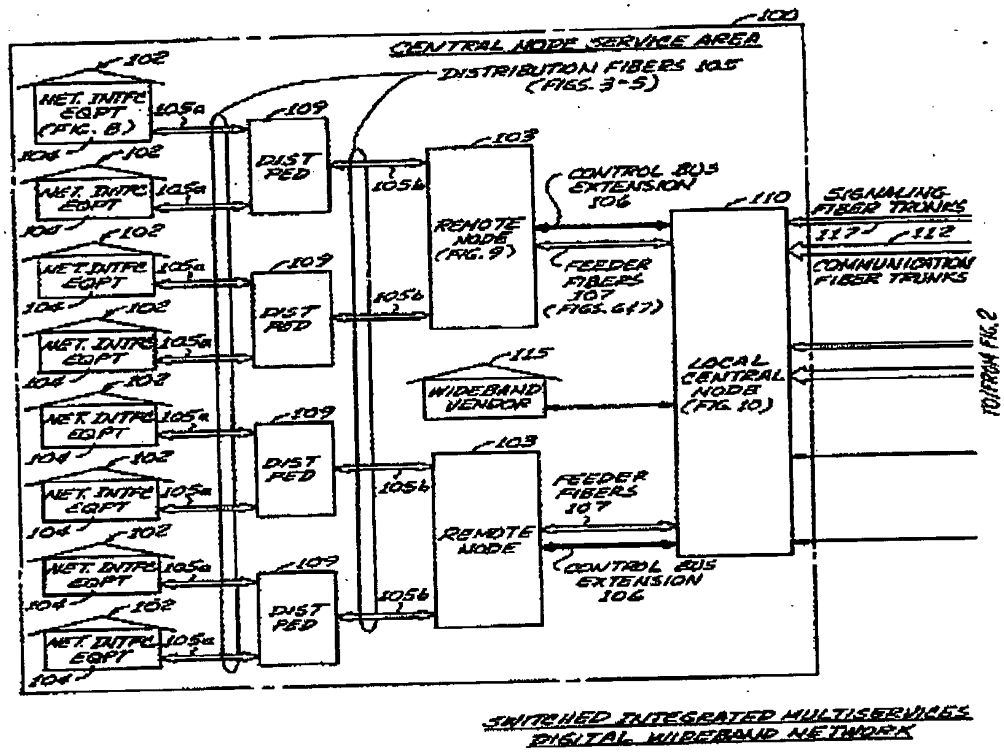


FIG. 1

In Figure 9 (reproduced below), each remote node 103 includes a switching and control device 502. The switching and control device 502 performs the remote node functions of multiplexing and demultiplexing point-to-point narrowband communications and distribution and changing of multipoint wideband communications.

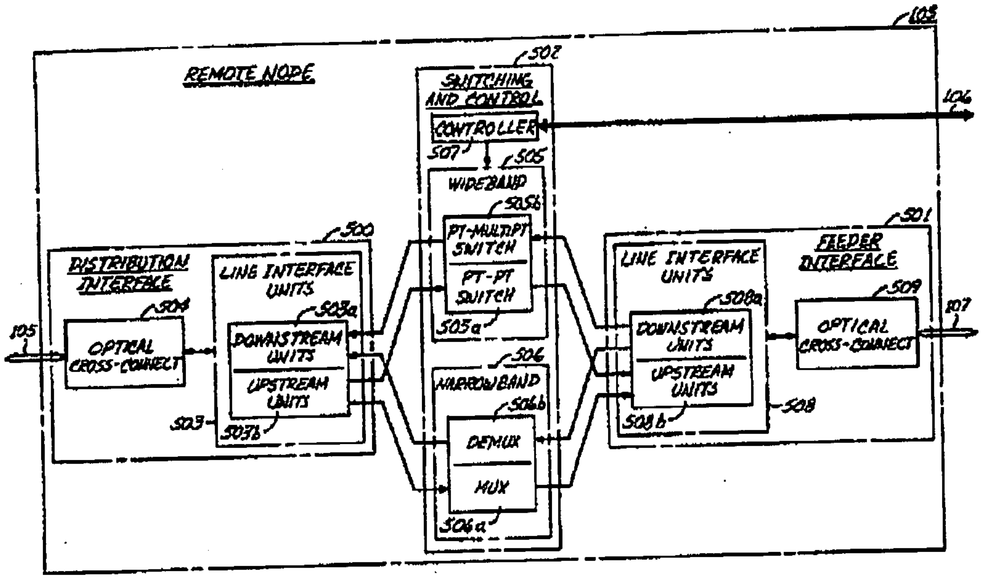


FIG. 9

The switching and control device 502 may also have the functionality of a private branch exchange. The switching and control device 502 handles video channels 205 as well as voice and data channels 206. See Lehman reference, column 18, line 65 through column 19, line 20.

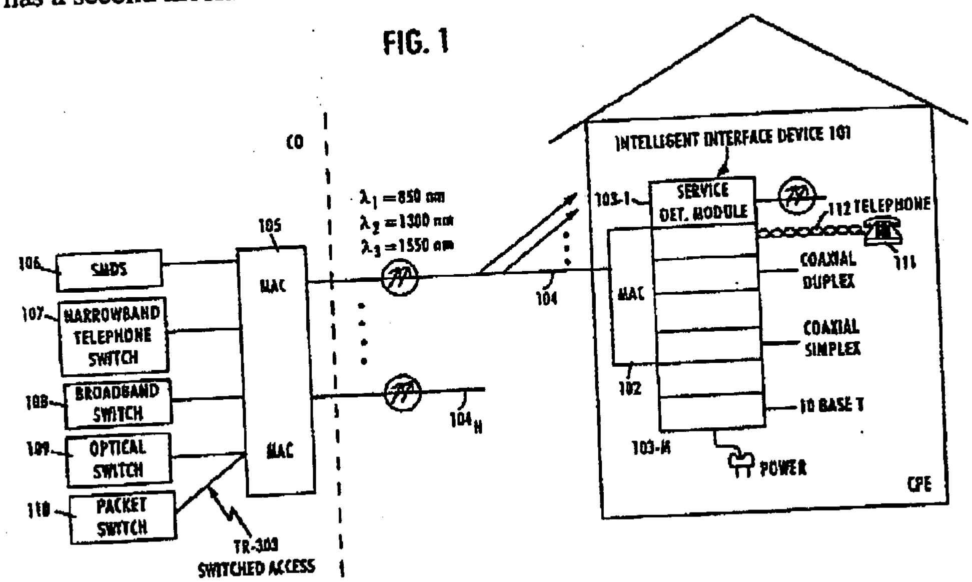
Similar to the Yamaguichi, Farris, and Bourne references, the Lehman reference does not provide for any teaching of a data service hub for sending downstream optical RF modulated television broadcast signals on a second optical waveguide; a plurality of multiplexers, where each multiplexer corresponds to a respective optical tap; a plurality of bi-directional splitters for receiving downstream and upstream optical signals, each bi-directional splitter coupled to a respective optical transmitter and a respective optical receiver; a routing device for combining upstream electrical data signals from respective multiplexers into one electrical signal that modulates the optical transceiver; and an optical splitter coupled to the second optical waveguide and respective optical diplexers, the diplexers for combining the downstream optical RF modulated television broadcast signals from the second optical waveguide with downstream optical data signals.

The Examiner admits that the Farris, Yamaguichi, Bourne, and Lehman references fail to provide any teaching of a time division multiple access (TDMA) protocol for the transmission of signals over an optical network system. To make up for this deficiency, the Examiner relies upon the Williams reference.

The Williams Reference

The Examiner refers the Applicants to column 13, lines 46-65 of the Williams reference. The Williams reference in Figure 1 illustrates an optical network that includes a first media access controller 105 in a central office and an intelligent interface device 101 on the subscriber side that has a second media access controller 102.

FIG. 1

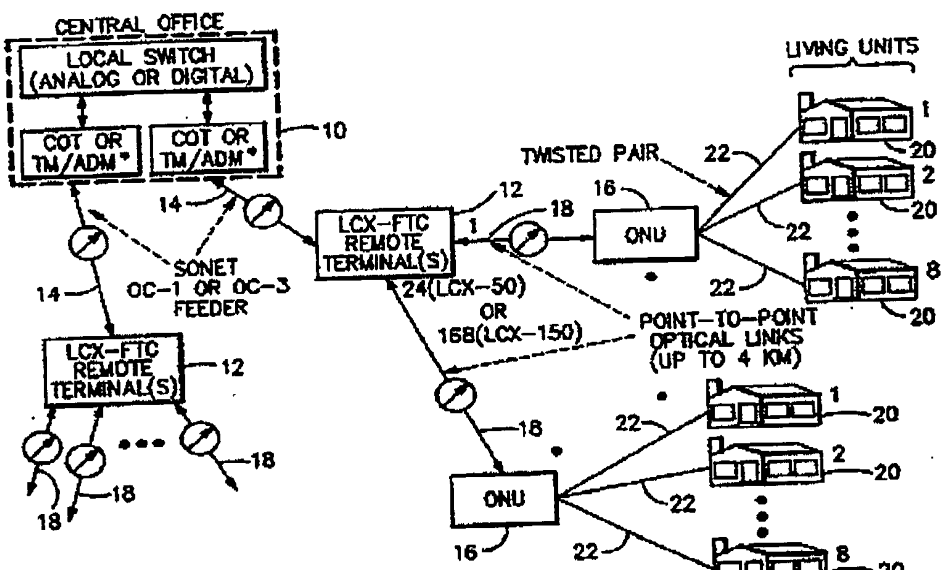


The first media access controller 105 on the network side is coupled to a switched multi-megabit data services (SMDS) network input. The first media access controller 105 is also coupled to a narrowband telephone switch 107, a broadband switch 108, an optical switch 109, and a packet switch 110. The fiber optic transmission path 104 is preferably a single multifiber optical pipe that can support wavelength division multiplexed and time division multiplexed optical signals. See Williams reference, column 9, lines 26-59.

Similar to the Yamaguichi, Farris, Bourne references, and Lehman references, the Williams reference does not provide for any teaching of a data service hub for sending downstream optical RF modulated television broadcast signals on a second optical waveguide; a plurality of multiplexers, where each multiplexer corresponds to a respective optical tap; a plurality of bi-directional splitters for receiving downstream and upstream optical signals, each bi-directional splitter coupled to a respective optical transmitter and a respective optical receiver; a routing device for combining upstream electrical data signals from respective multiplexers into one electrical signal that modulates the optical transceiver; and an optical splitter coupled to the second optical waveguide and respective optical diplexers, the diplexers for combining the downstream optical RF modulated television broadcast signals from the second optical waveguide with downstream optical data signals.

<u>The Burton Reference</u>

The Examiner relies on the Burton reference to provide a teaching of a data service provider 10, a laser transceiver node 12, and an optical transmitter 190 (Figure 17). In Figure 1, the central office or data service provider is coupled to a loop carrier cross connect (LCX) fiber to the curb (FTC) remote terminal 12 by an optical fiber 14. The laser transceiver node or remote terminal 12 is coupled to optical network units 16 by an optical fiber 18.



*LCX-50/150 CENTRAL OFFICE TERMINAL (COT) FOR ANALOG SWITCH OR TM-50 (OC-1)/ADM-150 (OC-3) FOR DIGITAL SWITCH

NOTE: EACH (RESIDENTIAL) OPTICAL NETWORK UNIT (ONU) SUPPORTS UP TO 8 LIVING UNITS (2 POTS LINES PER LIVING UNIT)

FIG.1

The optical network units 16 are coupled to the subscribers 20 by either twisted wire pairs or coaxial cables 22. The remote terminals 12 include optical to electrical and electrical to optical converters for dividing signals between additional optical network units 16. The remote terminals 12 receive signals from subscribers for selecting the video programming desired by the subscribers. See Burton, column 10, lines 24-46.

Similar to the Farris reference, the Burton reference does not describe, teach, or suggest (a) a data service hub for sending downstream optical RF modulated television broadcast signals on a second optical waveguide; (b) a plurality of optical taps; (c) a plurality of subscriber optical interfaces, where each subscriber optical interface provides electrical communications to a subscriber, each subscriber optical interface coupled to a respective optical tap by an optical waveguide, for receiving the downstream optical signals from a respective optical tap and converting the downstream optical signals into downstream electrical signals; (d) a plurality of multiplexers, where each multiplexer corresponds to a respective optical tap; (e) a plurality of bi-directional splitters for receiving downstream and upstream optical signals, each bi-directional splitter coupled to a respective optical transmitter and a respective optical receiver; (f) a routing device for combining upstream electrical data signals from respective multiplexers into one electrical signal that modulates the optical transceiver; and (g) an optical splitter coupled to the second optical waveguide and respective optical diplexers, the diplexers for combining the downstream optical RF modulated television broadcast signals from the second optical waveguide with downstream optical data signals.

Conclusion Regarding Independent Claim 53

Therefore, in view of the aforementioned discussion, it is apparent to one of ordinary skill in the art that the Farris, Bourne, Yamaguchi, Lehman, Williams, and Burton references, alone or in combination, cannot anticipate or render obvious the recitations as set forth in newly added independent Claim 53. Accordingly, an early notice that this claim is allowable over the prior art of record is respectfully requested.

Independent Claim 63

It is respectfully submitted that the Farris, Bourne, Yamaguchi, Lehman, Williams, and Burton references considered alone or in combination fail to describe, teach, or suggest the

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recitations enumerated in Claim 63. These references fail to describe, teach, or suggest a method for communicating optical signals from a data service provider to at least one subscriber that includes the combination of (1) sending downstream optical data signals on a first optical waveguide from a data service hub; (2) sending downstream optical RF modulated television broadcast signals on a second waveguide from the data service hub; (3) converting the downstream optical data signals into electrical data signals; (4) routing the electrical data signals to predetermined optical transmitters; (5) converting the electrical data signals back into optical data signals with each optical transmitter; (6) coupling an optical splitter to a plurality of diplexers; (7) dividing downstream optical RF modulated television broadcast signals from the second optical waveguide with a splitter among the plurality of diplexers; (8) combining the downstream optical RF modulated television broadcast signals from the second optical waveguide with downstream optical data signals from each optical transmitter with a respective diplexer; (9) propagating the combined optical signals over an optical waveguide; and (10) receiving the combined optical signals and dividing them between a plurality of optical waveguides coupled to a plurality of subscriber optical interfaces.

Specifically, as noted above with respect to independent Claim 53, the Farris, Bourne, Yamaguchi, Lehman, Williams, and Burton references do not provide any teaching of (a) sending downstream optical RF modulated television broadcast signals on a second waveguide from the data service hub; (b) coupling an optical splitter to a plurality of diplexers; (c) dividing downstream optical RF modulated television broadcast signals from the second optical waveguide with a splitter among the plurality of diplexers; (d) combining the downstream optical RF modulated television broadcast signals from the second optical waveguide with downstream optical data signals from each optical transmitter with a respective diplexer; (e) propagating the combined optical signals over an optical waveguide; and (f) receiving the combined optical signals and dividing them between a plurality of optical waveguides coupled to a plurality of subscriber optical interfaces.

Therefore, in view of the aforementioned discussion, it is apparent to one of ordinary skill in the art that the Farris, Bourne, Yamaguchi, Lehman, Williams, and Burton references, alone or in combination, cannot anticipate or render obvious the recitations as set forth in newly added independent Claim 63. Accordingly, an early notice that this claim is allowable over the prior art of record is respectfully requested.

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Dependent Claims 54-62 and 64-67

The Applicants respectfully submit that the above identified dependent claims are allowable because each of their respective independent claims are patentable over the cited references. The Applicants also respectfully submit that the recitations of these dependent claims are of patentable significance.

In view of the foregoing, the Applicants respectfully request that the Examiner to indicate that Claims 54-62 and 64-67 are allowable over the prior art of record.

Conclusion

The foregoing is submitted as a full and complete response to the Office Action mailed on October 24, 2003. The Applicants and the undersigned thank SPE Chan and Examiner Bello for their consideration of these remarks. The Applicants respectfully submit that the present application is in condition for allowance. Such action is hereby courteously solicited.

If the Examiners believe that there are any issues that can be resolved by telephone conference, or that there are any formalities that can be corrected by an Examiner's amendment, the Examiners are urged to contact the undersigned in the Atlanta Metropolitan area at telephone number (404) 572-2884.

Respectfully submitted,

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